

daylight&sunlight

**Daylight and Sunlight Report
for the Proposed Development at
25 Warren Road, Ickenham, UB10 8AA**

Prepared for: **GA & A Design**
Prepared by: **Jonathan Nash LLB (Hons)**
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Daylight and Sunlight (UK) Limited
20 - 22 Wenlock Road, London, N1 7GU
T 0845 052 1146 W daylightandsunlight.co.uk

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Registered office: 20 - 22 Wenlock Road, London, N1 7GU
VAT number 978498532.



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1. Executive Summary

1.1 Scope of Service

1.1.1 We have been instructed by GA & A Design to consider the potential impact upon the amenity of the surrounding residential amenity, which may arise from the proposed development at 25 Warren Road, Ickenham, UB10 8AA.

1.2 BRE Assessment Criteria

1.2.1 To ensure that this assessment has been appropriately considered, daylight and sunlight assessments have been undertaken in accordance with the Building Research Establishment Report 'Site Layout Planning for Daylight and Sunlight – A Guide to Good Practice' 2011 (the "BRE guide") and also on British Standard 8206 – 2: 2008 – 'Lighting for Buildings – Part 2: Code of Practice for Daylighting', to which the BRE report refers.

1.2.2 The standards and tests applied within this assessment are briefly described in Appendix A.

1.3 Daylight and Sunlight

1.3.1 Regarding the surrounding properties the proposed development is generally BRE compliant.

1.3.2 We noted transgressions to the ground floor living room of 23 Warren Road, which are unsurprising given that the living room windows are located so close to the common boundary.

1.3.3 The BRE cites special circumstances, where buildings located uncommonly close to the site boundary, they may be considered as "bad" neighbours, taking more than their fair share of light. Accordingly, a greater reduction in daylight or sunlight may be unavoidable and so the local authority may wish to apply different target values.

1.3.4 Nonetheless, with the application of the mirror-image principle, the proposed development is technically BRE compliant.

1.4 Generally

1.4.1 When considering the numerical results, it is important to approach and interpret the BRE guidelines flexibly along with the following material mitigating factors:

*The BRE guidelines recognise that buildings located uncommonly close to the site boundary, as is the case here, may be considered as "bad" neighbours, taking more than their fair share of light. Accordingly, a greater reduction in daylight or sunlight may be unavoidable and so the local authority may wish to apply different target values.

*Where buildings match the height and proportions of existing surrounding buildings some transgressions will be inevitable.

* Also, where the sites are undeveloped or are infill sites, again a higher degree of obstruction may be unavoidable, leading to a higher frequency of non-compliance

*Kitchens and bedrooms are given less weighting than that of a living room.



2. Introduction

2.1 Scope of Service

2.1.1 We have been instructed by GA & A Design to consider the potential impact upon the amenity of the surrounding residential amenity, which may arise from the proposed development at the 25 Warren Road, Ickenham, UB10 8AA.

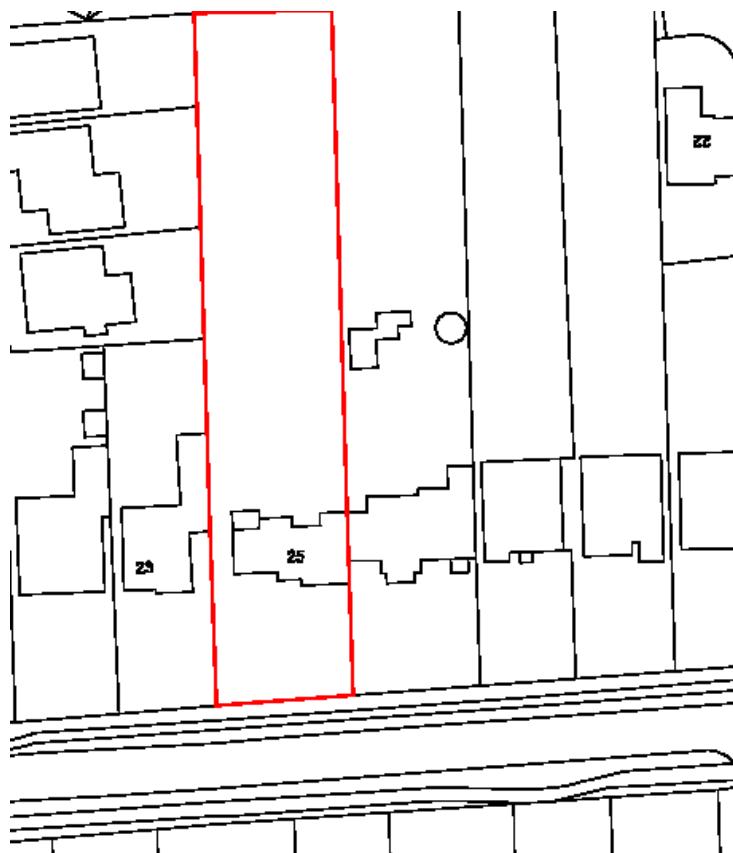
2.2 Assessment

2.2.1 To ensure that this assessment has been appropriately considered, daylight and sunlight assessments have been undertaken in accordance with the Building Research Establishment Report 'Site Layout Planning for Daylight and Sunlight – A Guide to Good Practice' 2011 (the "BRE guide") and with the British Standard 8206 – 2: 2008 – 'Lighting for Buildings – Part 2: Code of Practice for Daylighting', to which the BRE report refers.

2.2.2 The standards and tests applied within this assessment are briefly described in Appendix A.

2.2.3 The existing buildings adjacent to the site are shown on the Site Location Plan below.

Site Location Plan





2.2.4 The existing buildings adjacent to the site considered for this report are listed in the following table. Some of these buildings may not require a comprehensive assessment with the reasons for these findings given later in this report under section 3: Results and Consideration.

Adjacent Building Summary Table		
Name/Address of Building	Assumed Use of Building	Position in Relation to the Proposed Development
23 Warren Road	Residential	West

2.3 Limitations

- 2.3.1 Our assessment is based on the proposed development drawings by GA & A Design.
- 2.3.2 Topographical survey information was provided for the site and adjacent buildings. Where buildings were not surveyed, the locations and heights were derived from site photographs and oblique aerial photography.
- 2.3.3 We refer you to the drawings which accompany this report for a list of the third party information relied upon which our 3D computer model and resultant analyses are based.



3. BRE Criteria and Mitigating Factors

3.1 BRE Daylight Criteria

3.1.1 The BRE guide target value for the Vertical Sky Component Assessment (VSC) is 27%. However, where the values are lower than this in the existing situation, the BRE allows a reduction of 20%, *subject to mitigating factors*.

3.1.2 For Daylight Distribution, namely, sky visibility at table level, the BRE allows a reduction of 20%, *subject to mitigating factors*.

3.2 BRE Sunlight Criteria

3.2.1 The BRE guide target value for the Annual Probable Sunlight Hours (APSH) to a living room, is 25%, 5% of which should be enjoyed during the winter months. However, where the values are lower than this in the existing situation, the BRE allows a reduction of 20%, again, *subject to mitigating factors*.

3.2.2 The overshadowing assessment is undertaken on 21 March, the spring equinox. This assessment shows areas of a subject amenity area where less than 2 hours of sunlight will be available during the winter period, however, the subject area may still receive some sunlight during the summer. If an open amenity area, is more than 50% in shade for more than 2 hours in either existing or proposed situations, and is reduced by more than 20% of its existing value of a new development, then that loss is likely to be noticeable.

3.2.3 These criteria are, however, purely numerical guidelines. They can be misinterpreted as a hard and fast rule, which is of course an unsustainable argument at planning. A loss of greater than 20% implies that the loss may be noticeable by its occupants, but noticeable does not mean, significant or adverse, it just means that it needs to be considered in the broader context. Namely, is the development acceptable in respect of all the surrounding circumstances? This leads us on to the mitigating factors.

3.3 Mitigating Factors

3.3.1 As with all development sites, it would be helpful at this stage to outline the mitigating factors.

3.3.2 Mitigating factors are to be considered in conjunction with the numerical data, particularly with regards to the specific surrounding circumstances, to arrive at a more balanced view.

3.3.3 By balanced, it is meant that the two often conflicting material considerations at planning, (to have amenity protected (neighbours) and to utilise adjacent land in a reasonable manner (developer), need to be considered fairly.

3.3.4 The BRE guidelines states at the beginning and throughout that it is “to be interpreted flexibly”; “not intended to constrain but help the designer”; and “not to be used as an instrument of planning policy”.



3.3.5 The simplest way of approaching all the above is to keep in mind one basic question – “is it [the development] fair/balanced/acceptable in consideration of all the surrounding circumstances”.

Mitigating Factor #1

3.3.6 The main mitigating factor is, that where buildings located uncommonly close to the site boundary, they may be considered as “bad” neighbours, taking more than their fair share of light. Accordingly, a greater reduction in daylight or sunlight may be unavoidable and so the local authority may wish to apply different target values.

Mitigating Factor #2

3.3.7 Where sites are undeveloped or are infill sites, again a higher degree of obstruction may be unavoidable, leading to a higher frequency of non-compliance. So, for example, you have a gap in a line of terraced properties, or an existing street scape of 6-storey high buildings. Where a developer wishes to fill this gap, or indeed reinstate a previous building, it would certainly be acceptable in planning terms, irrespective of the potential effect on surrounding buildings.

Mitigating Factor #3

3.3.8 The BRE guidelines also recognises that where buildings match the height and proportions of existing surrounding buildings a higher degree of obstruction may be unavoidable, leading to a higher frequency of non-compliance.

Mitigating Factor #4

3.3.9 Additionally, kitchens and bedrooms are generally given less weighting than that of a principal room such as a living room.



4. Results and Consideration

4.1 Daylight

4.1.1 Detailed test results for the buildings assessed for daylight availability in accordance with the BRE recommendations are shown in Appendix C.

4.2 Our Approach

4.2.1 We have assessed the surrounding residential buildings that are most likely to be affected by the proposed development. Other properties are either retail premises, or aligned at an oblique angle, or are considered to be too far away to be affected have been considered, but not assessed.

4.2.2 We have also considered the windows and the rooms of each building listed. With some buildings, we have obtained floor plans from the local authority planning portal, or sales brochures. Where building plans are not readily available, generally, we designate the windows and rooms as habitable within the BRE framework, unless there are obvious clues that would suggest otherwise.

4.2.3 Things such as opaque glazing, soil pipes, stairwells etc., suggest toilets, bathrooms, or circulation spaces, which in accordance with the BRE guidelines need not be assessed.

4.2.4 For habitable rooms, we look for paraphernalia in the windows, blinds, flue pipes, which might suggest a kitchen, smaller windows with net curtains which suggests bedrooms and say larger windows for living rooms etc.

Existing Baseline

4.2.5 The site is situated to the north side of Warren Road. It currently comprises a 2-storey dwelling, see accompanying drawing 1876/DSO/01.

Proposed Development

4.2.6 The proposed development plans will enlarge the footprint of the existing dwelling, a single-storey rear extension and additional rooms to the roof level, see accompanying drawing 1876/DSO/01.

4.2.7 We have considered and/or assessed the habitable windows and rooms of the adjacent buildings at that are most likely to be affected by the proposed development.

23 Warren Road

4.2.8 This dwelling is situated immediately west sharing a common boundary with the site, see accompanying drawing 1876/DSO/01.

4.2.9 To the gable end of #23, at ground floor level, the window (W2) serves what appears to be a dual aspect living room area, with another window to the front elevation (W1) set underneath the above projection. The window to the first floor level (W1) serves what appears to be a bedroom.



- 4.2.10 Turning now to the assessment results, the windows and habitable rooms were assessed for Vertical Sky Component (VSC), Daylight Distribution (DD), and Sunlight (APSH) respectively.
- 4.2.11 For sunlight (APSH), whilst W1 loses 2% APSH over the course of the year, the BRE guidelines allows a maximum loss of 4% APSH over the course of the year even if in percentage terms the existing vs proposed loss is more than 20%.
- 4.2.12 Regarding VSC, all windows assessed meet or are fractionally off meeting the BRE criteria. The ground floor windows W1 and W2 lose 21% and 22% respectively.
- 4.2.13 Regarding Daylight Distribution, the first floor bedroom meets the BRE criteria, but the ground floor living room losses 29%, which is classed as a minor adverse loss.
- 4.2.14 The living room is, however, located very close to the common boundary and so some losses beyond the BRE guidelines are to be expected. This is one of the "special circumstances" that are outlined in the BRE guidelines and our mitigating factors section of our report.
- 4.2.15 Namely, where buildings located uncommonly close to the site boundary, they may be considered as "bad" neighbours, taking more than their fair share of light. Accordingly, a greater reduction in daylight or sunlight may be unavoidable and so the local authority may wish to apply different target values.
- 4.2.16 As an extension to the BRE standard tests, the guidelines provides a clause for specific situations such as this.

5. The Mirror Image Principle

5.1 The Principle

- 5.1.1 The BRE guidance at Appendix F provides an example that may be adopted where side windows are unusually close to the common boundary, and where if conventional BRE standards are applied, they have the potential to sterilise adjacent development land.
- 5.1.2 It states, "to ensure that new development matches the height and proportions of existing buildings, the VSC and APSH targets for those windows could be set to those for a "mirror-image" building of the same height and size, an equal distance away from the boundary."
- 5.1.3 To put it another way, the mirror image of the subject building (23 Warren Road) becomes the *existing scenario*, and the proposed development is then assessed against that.

5.2 Commentary

- 5.2.1 The principle is important because it balances both material considerations at planning - the "right" for a developer to utilise his land in a reasonable manner, and also to protect adjacent amenity. Essentially, to promote fairness between adjacent lands by saying the neighbour has a 3/4-storey dwelling it is only fair that the developer can have one too, notwithstanding the potential impact, in all its forms, to the side windows facing across the development land.



5.2.2 Although it is not expressly stated within the BRE guidelines, the natural consequence of the principle is, it over-rides the conventional BRE criteria for all potential impacts to side windows of adjacent buildings such as light, overshadowing, privacy, and outlook. This is because they are inextricably linked. We feel that the author of the BRE guidelines had intended the mirror image principle to be read this way. If not, they would have been expressly reserved.

5.3 Application of the Principle

5.3.1 As outlined above, the existing scenario is the mirror image of 23 Warren Road, set an equal distance from the boundary, which was then assessed against the proposed development. We found that for VSC the results were almost identical to the ground floor level windows, with a slight gain to W2, and for DD there appears to be just a 13% to the ground floor living room. So, in that sense it despite being only slightly bigger to the rear portion of the living room, it technically meets the BRE guidelines for daylight and sunlight.

5.3.2 To put it another way it is as if the building to #25 was exactly a like for like building in terms of VSC, but only slightly bigger from within the living room, accounting for the aforementioned 13% DD; So, in BRE terms there would be no appreciable change in VSC, and only a 13% reduction in DD.

Overshadowing

5.3.3 For overshadowing, the proposed development is situated east of the amenity areas to #23. The sun would easily meet the BRE criteria of 2 hours of sun over 50% of the amenity area between the hours of 11am and 1pm when the sun is at its highest. There might be a very small reduction in sun during the early morning but late morning and for the rest of the day the proposed development would cease to have any potential impact.

6. Conclusion

6.1 Daylight and Sunlight

6.1.1 Regarding the surrounding properties the proposed development is generally BRE compliant.

6.1.2 We noted transgressions to the ground floor living room of 23 Warren Road, which are unsurprising given that the living room windows are located so close to the common boundary.

6.1.3 The BRE cites special circumstances, where buildings located uncommonly close to the site boundary, they may be considered as “bad” neighbours, taking more than their fair share of light. Accordingly, a greater reduction in daylight or sunlight may be unavoidable and so the local authority may wish to apply different target values.

6.1.4 Nonetheless, with the application of the mirror-image principle, the proposed development is technically BRE compliant.



6.2 **Generally**

6.2.1 When considering the numerical results, it is important to approach and interpret the BRE guidelines flexibly along with the following material mitigating factors:

*The BRE guidelines recognises that buildings located uncommonly close to the site boundary, as is the case here, may be considered as “bad” neighbours, taking more than their fair share of light. Accordingly, a greater reduction in daylight or sunlight may be unavoidable and so the local authority may wish to apply different target values.

*Where buildings match the height and proportions of existing surrounding buildings some transgressions will be inevitable.

* Also, where the sites are undeveloped or are infill sites, again a higher degree of obstruction may be unavoidable, leading to a higher frequency of non-compliance

*Kitchens and bedrooms are given less weighting than that of a living room.

Appendix A

BRE Assessments

BRE Assessments

Introduction

The Building Research Establishment Report “Site Layout Planning for Daylight and Sunlight – a guide to good practice 1991” (“the BRE Guidelines”) provides advice to building designers on site layout planning in order to achieve good daylight and sunlight amenity, not only to the proposed development and the open spaces between the proposed blocks, but also to the existing surrounding properties.

As part of this advice, the Building Research Establishment (BRE) have developed a series of assessments along with numerical guidelines so that the potential for good daylight and sunlight amenity can be achieved.

In general, the application of the BRE Guidelines are more appropriate for low density suburban development sites where there is a greater flexibility for site layout planning. In dense urban areas, however, development sites are usually constrained to a greater degree, often by immediately adjacent buildings etc. Accordingly, when dealing with dense urban areas the guidelines should be applied flexibly. This point is expressly recognised by the BRE Guidelines, which states in the introduction at page 1:

‘The Guide is intended for building designers and their clients, consultants and planning officials. The advice given here is not mandatory and this document should not be seen as an instrument of planning policy. Its aim is to help rather than constrain the designer. Although it gives numerical guidelines, these should be interpreted flexibly because natural lighting is only one of many factors in site layout design.... In special circumstances the developer or Planning Authority may wish to use different target values. For example, in a historic city centre a higher degree of obstruction may be unavoidable if new developments are to match the height and proportions of existing buildings....’

Daylight

The criteria for assessing daylight to existing surrounding buildings are outlined at pages 4 to 8 of the BRE Guidelines. Generally, daylight assessments should be undertaken to habitable rooms within dwellings and to principal rooms in non-domestic buildings such as schools, hospitals and offices where the occupants have a reasonable expectation of daylight.

Whilst the BRE Guidelines contain a number of rules of thumb that inform site layout design some relate to specific situations, such as domestic developments to the rear of a property, which although useful may not be considered appropriate for general site layout design.

The principal assessments used to assess daylight to existing surrounding buildings are outlined in more detail below along with a further daylight assessment, usually applied to proposed dwellings, which is admissible provided it is agreed with the local authority, or there are past precedents.

25° section line assessment

The first assessment is known as the [modified] 25° section line test. It is a simple rule of thumb that determines whether an existing building should still receive adequate daylight with the proposed development in place.

The BRE guide states at page 11:

“If any part of a new building or development, measured in a vertical section perpendicular to a main window wall of an existing building, from the centre of a lowest window, subtends an angle of more than 25° to the horizontal may be affected.”

This assessment is most appropriate for well spaced, low-density or low-rise, uniform proposed developments. It is not an appropriate assessment for dense urban environments, where the existing building on the development site already subtends at an angle greater than 25° to the horizontal from the subject window. It is for this reason this 25° assessment is generally dispensed with and the more detailed assessments outlined below are entered into at the outset.

The Vertical Sky Component (“VSC”) Assessment

The Vertical Sky Component (“VSC”) assessment represents the amount of available daylight received directly from the sky at a particular window. The reference point for this assessment is the centre of the window, on the plane of the outer window wall.

A VSC is expressed as a percentage, being a ratio of that part of illuminance on a vertical plane (a window) that is received from a Standard Overcast Sky (CIE Sky), to the illuminance received on a horizontal plane on an unobstructed hemisphere of Standard Overcast Sky. To put it another way it is simply the amount of direct sky a window receives, howsoever obstructed, expressed as a percentage of the amount of direct sky a horizontal unobstructed roof-light would receive.

The maximum percentage of direct skylight a vertical window can receive from a Standard Overcast Sky is 39.62%, or 40% when rounded. The BRE have determined that where a VSC value of 27% is achieved, then enough skylight (direct daylight) should reach the window of an existing building. This value is roughly equivalent to a uniform obstruction of 25°, with reference to the above assessment. The Guidelines go on to state:

“If the vertical sky component, with the new development in place, is both less than 27% and less than 0.8 times its former value, (a 20% reduction), then the occupants of the existing building will notice the difference.”

Consequently, the daylight to an existing building, as a result of a proposed development, may be reduced by 20% before that loss becomes noticeable.

The Daylight Distribution (“DD”) Assessment

The Daylight Distribution Assessment is undertaken at working plane level from within a subject room and represents the change in skyline when viewed through a subject window. The working plane level is set at 0.85m above floor level in dwellings and 0.70m in offices, however, in practice this distinction in height is not normally made, and so the working plane is generally set at 0.85m.

If significant areas beyond the no-skyline i.e. the point beyond the line where no sky can be seen at working plane level, the room will usually appear gloomy and supplementary electric lighting will be required. The BRE Guidance states:

“If, following construction of a new development, the no-sky line moves so that the area of the existing room which does not receive direct skylight is reduced to less than 0.8 times its former value, (a 20% reduction), then this will be noticeable to the occupants, and more of the room will be poorly lit.”

Consequently, the daylight to an existing building, as a result of a proposed development, may be reduced by 20% before that loss becomes noticeable.

The VSC and DD are the 2 principal assessments that are required to be undertaken in order to assess daylight to existing surrounding buildings.

The Average Daylight Factor (“ADF”) Assessment

A further daylight assessment, which may be undertaken, provided it is accepted by the local authority, is known as the Average Daylight Factor (ADF). Strictly speaking ADF assessments are used to determine the daylight availability to units within a proposed development, however, in more recent times the ADF assessment has been accepted by local authorities as a valid assessment for existing surrounding buildings.

An ADF assessment takes into account the amount of direct sky visibility incident on a window serving a subject room, the transmittance of the light through the glass, and the reflectance of that resultant light from the entire surface area of the room, which is then expressed as a percentage.

The ADF values recommended in the British Standard BS8206 Part 2 to which the BRE refers are: 2% for kitchens or open plan living areas, 1.5% for living rooms and 1% for bedrooms if supplementary electric lighting is provided.

Nb. The guidelines outlined in the latest edition of BS8206 Part 2: 2008 are now applied.

Sunlight

Sunlight is valued in both residential and commercial buildings. It is seen as providing warmth and cheerfulness to a room, whilst also giving the occupants a therapeutic effect and a sense of wellbeing.

In residential properties the main requirement for sunlight is in the living room or conservatories, which should be assessed if they have a main window facing within 90° of due south. Sunlight is considered less important in kitchens and bedroom, although care should be taken not to block out too much.

In commercial or non-domestic buildings, the requirement for sunlight varies according to the use of the building. The BRE recommends that for a commercial building any space that has a particular or special requirement for sunlight should be assessed.

Annual Probable Sunlight Hours (APSH) Assessment

The APSH assessment is undertaken to the main window of residential and commercial buildings, where the window faces within 90° of due south. “Probable Sunlight Hours” may be defined as the total number of hours in the year that the sun is expected to shine on unobstructed ground, allowing for average levels of cloudiness.

At page 17 of the BRE guidelines the criteria for the APSH assessment are as follows: -

'If a living room of an existing dwelling has a main window facing within 90° of due south, and any part of a new development subtends an angle of more than 25° to the horizontal measured from the centre of the window in a vertical section perpendicular to the window, then the sunlighting of the existing dwelling may be adversely affected. This will be the case if a point at the centre of the window, in the plane of the inner window wall, received in the year less than one quarter (25%) of annual probable sunlight hours including at least 5% of annual probable sunlight hours between 21 September and 21 March, and less than 0.8 times its former sunlight hours during either period.'

Consequently, the sunlight to an existing building, as a result of a proposed development, may be reduced by 20% in either the annual or winter periods before that loss becomes noticeable.

Overshadowing

The BRE guidance also offers advice on how to preserve sunlight to both existing and proposed open amenity spaces. Areas such as main back gardens of dwellings, parks, playing fields, playgrounds, waterways and public spaces such should be assessed. Small front gardens to dwellings and parking areas need not be assessed.

The permanent overshadowing assessment

The permanent overshadowing assessment is undertaken on 21 March, the spring equinox. This assessment shows areas of a subject amenity area where no sunlight will be available during the winter period, however, the subject area may still receive some sunlight during the summer.

The BRE states at page 20:

"for it to appear adequately sunlight throughout the year, at least half of a garden or amenity area should receive at least 2 hours of sunlight on 21 March. If, as a result of new development, an existing garden or amenity area does not meet these guidelines, and the area which can receive 2 hours of sun on 21 March is less than 0.8 times its former value (a 20% reduction), then the loss of sunlight is likely to be noticeable".

Consequently, if an open amenity area, is more than 50% in shade for more than 2 hours in either existing or proposed situations, and is reduced by more than 20% of its existing value as a result of new development, then that loss is likely to be noticeable.

The transient overshadowing assessment

A further overshadowing assessment, sometimes requested by the local authority for larger developments, is the temporary, or transient overshadowing assessment. This assessment usually comprises hourly overshadowing images of the existing and proposed situations undertaken on key dates during the year such as 21 March, the spring equinox; 21 June, the summer solstice; and 21 December, the winter solstice.

The BRE guidance offers no express numerical values for this type of assessment, consequently it is purely subjective.

Appendix B

Context Drawings

Appendix C

Daylight Results / Sunlight Results



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Vertical Sky Component (VSC) Assessment/ Sunlight (APSH) Assessment

Floor Ref.	Room Ref.	Room	Use.	Window Ref.	Scenario	VSC	Difference	Condtn	Available Sunlight Hours					
									Annual %	Diff %	Condtn	Winter %	Diff %	Condtn
23 Warren Road														
Ground	R1	Living Room	W1	Existing	2.48	0.79	NO	5.00	0.40	YES	2.00	1.00	YES	
				Proposed	1.96			2.00			2.00			
			W2	Existing	19.62	0.78	NO		*North	*North		*North	*North	
				Proposed	15.29									
First	R1	Bedroom	W1	Existing	32.43	0.83	YES		*North	*North		*North	*North	
				Proposed	26.87									
23 Warren Road - Mirror Image														
Ground	R1	Living Room	W1	Existing	1.97	0.99	YES	2.00	1.00	YES	2.00	1.00	YES	
				Proposed	1.96			2.00			2.00			
			W2	Existing	14.69	1.04	YES		*North	*North		*North	*North	
				Proposed	15.29									
First	R1	Bedroom	W1	Existing	29.20	0.92	YES		*North	*North		*North	*North	
				Proposed	26.87									



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Daylight Distribution (DD) Assessment

Floor Ref.	Room Ref.	Room Use	Property Type	Room Area	Lit Area Existing	Lit Area Proposed	Pr/Ex	Meets BRE Criteria
23 Warren Road								
Ground	R1	Living Room	Area m2 % of room	17.08	16.14 94.49%	11.43 66.94%	0.71	NO
First	R1	Bedroom	Area m2 % of room	17.08	16.63 97.36%	16.33 95.59%	0.98	YES
23 Warren Road - Mirror Image								
Ground	R1	Living Room	Area m2 % of room	17.08	13.13 76.88%	11.43 66.94%	0.87	YES
First	R1	Bedroom	Area m2 % of room	17.08	16.63 97.36%	16.33 95.59%	0.98	YES